

# CĂTĂLINA CANGEA

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## PERSONAL PROFILE

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Third-year PhD student at the University of Cambridge, focused on learning multimodal and graph-structured representations of the world. Born on May 17, 1994 in Ploiești, România.

## EDUCATION

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**Department of Computer Science, University of Cambridge, UK**

PhD in Machine Learning (October 2017–present)

MPhil in Advanced Computer Science (October 2016–July 2017) *Distinction (81%)*

BA in Computer Science (October 2013–June 2016) *First Class (75%) - 3rd year*

**Colegiul Național "I.L.Caragiale", Ploiești, România**

Computer Science & Mathematics (September 2009–May 2013) *Valedictorian (grade 10/10)*

## RESEARCH PUBLICATIONS

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**Deep Graph Mapper: Seeing Graphs through the Neural Lens (joint first author)**

A fusion between Mapper (Topological Data Analysis) and GNNs that produces highly informative graph visualisations and a powerful pooling layer. Under review.

**The PlayStation Reinforcement Learning Environment (second author)**

New environment for evaluating RL algorithms. Sample action-driven abstraction for a PlayStation game. Support for OpenAI Gym, baseline results. Presented at the *NeurIPS 2019 Deep RL Workshop*.

**XFlow: Cross-modal Deep Neural Networks for Audiovisual Classification**

Multimodal architectures with cross-modal dataflow. SOTA on benchmarks. Published in *IEEE TNNLS*. Presented at the *ARM Research Summit 2017* and *CMCML Workshop, ICDL-EPIROB 2017*.

**VideoNavQA: Bridging the Gap between Visual and Embodied Question Answering**

Introduced a novel task that studies QA performance in visually rich, EQA-like settings with nearly-ideal navigation paths. Generalised VQA paradigms to reason across time. Published at *BMVC 2019*.

**Spatio-Temporal Deep Graph Infomax (third author)**

Unsupervised node representation learning using mutual information maximisation. Improves predictive performance of spatio-temporal auto-regressive models. Presented at the *ICLR 2019 RLGM Workshop*.

**Towards Sparse Hierarchical Graph Classifiers (joint first author)**

CNN-like architecture with sparse pooling for graph-structured data. Matched SOTA on benchmarks, memory reduced from  $O(V^2)$  to  $O(V + E)$ . Presented at the *NeurIPS 2018 R2L Workshop*.

## INTERNSHIPS AND ML EXPERIENCE

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**AI Residency—X, the moonshot factory**

May 2019–August 2019

Worked on an early-stage project, using and adapting recent ML techniques to a real-world problem.

**Software Engineer Intern—Facebook London**

June 2016–September 2016

Worked on the LogDevice team, making client operations on a distributed RocksDB data store more efficient and flexible, while leading to fewer system failures.

**Music Genre Classification using CNNs—Undergraduate Project**    October 2015–May 2016

Implemented a deep learning system in Python/CUDA, trained on 100 spectrograms per genre, accuracies of 99.2%, 80% and 69% for 2, 4 and 6 classes respectively. Dissertation received a First Class mark.

**Software Engineer Intern—Facebook New York**

July 2015–September 2015

Worked on iOS Product Infrastructure to reduce the time taken by the Facebook iOS app to load content close to the screen current view. Improved the infrastructure and network request prioritisation system.

**STEP Intern—Google Zürich**

June 2014–September 2014

Added processing progress for video uploads on YouTube. Developed a JavaScript client implementation that requests processing information from the server and thumbnail rendering of processing videos.

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**PROFESSIONAL SKILLS**

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**Programming Languages**

Python, C, C++, Standard ML, Java, C#, Objective-C, JavaScript

**Deep Learning APIs**

PyTorch, TensorFlow, Graph Nets, Sonnet, Keras, CUDA

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**TEACHING / SUPERVISING**

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**Master's projects:** *"Representation Learning for Spatio-Temporal Graphs"* (2018–2019), *"Dynamic Temporal Analysis for Graph Structured Data"* (2018–2019)

**Undergraduate projects:** *"Deep Learning for Music Recommendation"* (2017–2018), *"The PlayStation Reinforcement Learning Environment"* (2018–2019)

**Undergraduate courses:** Artificial Intelligence, Databases, Discrete Maths, Foundations of Computer Science, Logic and Proof, Machine Learning and Real-World Data.

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**EXTRACURRICULAR ACTIVITIES**

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**Chair/Deputy chair**, women@CL, University of Cambridge

October 2018–present

**ML Teaching Fellow**, Cambridge Spark

May 2018–present

**CS advisor**, Gateway Academic Development Programme

October 2015–May 2016

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**PREVIOUS EXTRACURRICULAR ACHIEVEMENTS**

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**Mathematics Contest "DUEL"**    *1<sup>st</sup> place (team), 3<sup>rd</sup> place (individual) (Czech Republic, 2012)***National Programming Olympiad**    *10<sup>th</sup> place and Silver Medal (2011), Participation (2010)***National English Language Olympiad**    *Special Prize for Best Writing Style (2010)*

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**LANGUAGES**

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English (fluent), French (beginner), Romanian (native)

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**INTERESTS**

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**Music**    Vocals and guitar in a rock band—we play in colleges, pubs and at Cambridge May Balls**Rowing**    King's Women's First Boat (Jan 2018–present), Darwin/King's Second Boat (Jan–Dec 2017)